

# INSTALLATION MANUAL

## DOWNFLOW SINGLE AND TWO STAGE ELECTRIC FURNACE WITH:

- **FACTORY INSTALLED ELECTRIC HEAT, OR**
- **NO HEAT MODELS WITH FIELD INSTALLED ELECTRIC HEAT KITS**



## MODELS: WE30 SERIES

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## SECTION I: GENERAL

The following list includes important facts and information regarding the electric furnace and its inclusions.

1. Furnace is rated at 240 volts AC at 60 Hertz
2. Furnace is the same size for all models
3. Four-wire thermostat operation for heating and cooling
4. A/C ready furnaces equipped with blower for A/C or Heat Pump operation
5. Holding Strap furnished with furnace
6. This furnace is designed for downflow application
7. This furnace must not be operated without furnace door installed

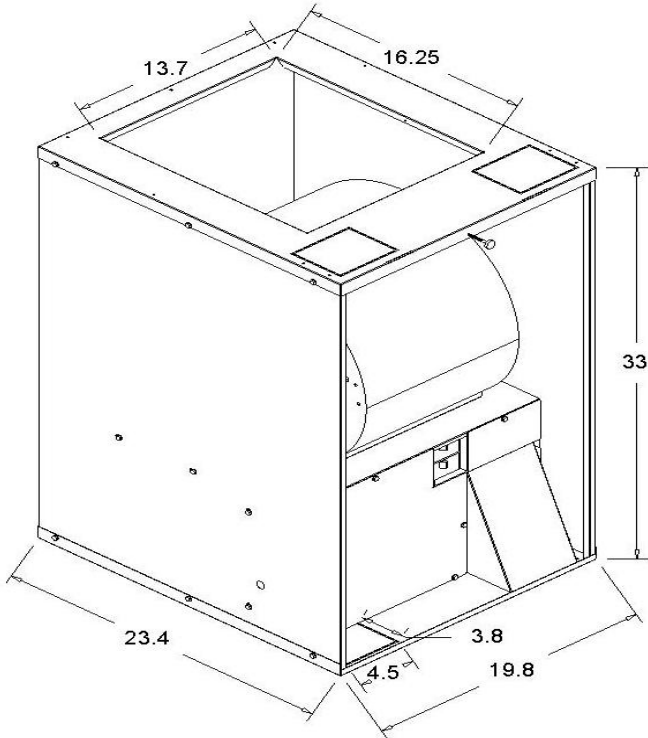
NOTE: This furnace and its components listed on the A/C and Heat Pump equipment sticker were listed in combination as a system by ETL for the United States.

### Blower Speed Tap Description

Tap 5 – High Speed – Cooling or Heat Pump Operation  
Tap 4 – Med-High Speed – Cooling or Heat Pump Operation  
Tap 3 – Medium Speed – Cooling or Heating Operation  
Tap 2 – Med-Low Speed – Heating Operation  
Tap 1 – Low Speed – Constant Circulation Operation Only.  
Tap 1 air circulation is around 200 CFM. This is not enough air flow for heating, cooling or heat pump operation. If Tap 1 is used for cooling the evaporator will freeze up. If Tap 1 is used for heating with electric heat the limits will open in a very short time frame.

**DO NOT USE SPEED TAP 1 FOR HEATING OR COOLING!**

**SAVE THIS MANUAL FOR FUTURE REFERENCE**



**Figure 1: Furnace Dimensions**

Models	ALL	ALL	ALL	ALL
Input kW	10	12	15	20
With "A" Coil	NO	NO	NO	NO
Air Temperature Range - °F	40-100	40-100	40-100	40-100
Max Outlet Air Temperature	180	180	185	185
Blower Size	10 x 9			
Max. External Static Pressure In W.C.	0.3			
Thermostat Circuit	24 VAC, 60 HZ, 40 VA			
Air Handler Cabinet Height	33 Inches			

**Table 1: Electric Furnace Model Specifications**

**Available Blower Motors**

- Standard Blower Motor - 5 SPD Constant Torque

Product Name	Type of Heat	Single Stage Heating	Type of Motor	Blower Motor Horse Power	Discharge Configuration	Heat Strip kW
W = Winchaster	E = Mobile Home Electric Heat	30	B = Constant Torque	4 = 1/2 HP	D = Downflow	010 = 10 kW Electric Heater
						012 = 12 kW Electric Heater
						015 = 15 kW Electric Heater
						020 = 20 kW Electric Heater

**Table 2: Furnace Model Nomenclature**

Coil Cabinet Model	Front Door of Cabinet	Open Top 17 3/4" x 21 3/4"	Maximum Air Flow CFM	1" Pleated Air Filter, In The Door	2" Pleated Air Filter, Top of Cabinet	Height	Depth	Width	Coil Sizes
97-FLSB-21	Louvered	N/A	1200	20x20		23 1/4"	25"	19 3/4"	All Mortex 96 series coils will fit in cabinet
97-FSOB-21	Solid		1600		20x24	23 1/4"	25"	19 3/4"	
97-FLOB-21	Louvered		1800	20x20	20x24	23 1/4"	25"	19 3/4"	
97-FLSB-27	Louvered	N/A	1600	20x30		30 1/2"	25"	19 3/4"	96-97 series coils and 98 series coils sizes up to 98-8W7
97-FSOB-27	Solid		1600		20x24	30 1/2"	25"	19 3/4"	
97-FLOB-27	Louvered		1800	20x20	20x24	30 1/2"	25"	19 3/4"	
97-FLSB-39	Louvered	N/A	1800	2ea 20x20		40 1/4"	25"	19 3/4"	All Mortex series coils will fit in cabinet
97-FSOB-39	Solid		2000		20x24	40 1/4"	25"	19 3/4"	
97-FG-18	Louvered	N/A	1200	N/A	N/A	18"	N/A	19 3/4"	Frame & Grills Non-Cabinet
97-FG-24	Louvered	N/A	1600	N/A	N/A	24"	N/A	19 3/4"	

**Table 3: Optional Cooling Cabinets and Return Air Grille Frame Assemblies**

## SECTION II: SAFETY



This is a safety alert symbol. When you see this symbol on labels or in manuals; be alert to the potential for personal injury.

Understand and pay particular attention to the signal words **DANGER, WARNING, or CAUTION.**

**DANGER:** indicates an **imminently** hazardous situation, which if not avoided, **will result in death or serious injury.**

**WARNING:** indicates a **potentially** hazardous situation, which if not avoided, **could result in death or serious injury.**

**CAUTION:** indicates a **potentially** hazardous situation, which if not avoided, **may result in minor or moderate injury.** It is also used to alert against unsafe practices and hazards involving property damage.

### **WARNING**

Improper installation may create a condition where the operation of the product could cause personal injury or property damage.

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual for assistance; or for additional information consult a qualified contractor, installer, or service agency.

### **CAUTION**

This product must be installed in strict compliance with the installation instructions and any applicable local, state, and national codes including, but not limited to; building, electrical, and mechanical codes.

### **WARNING**

#### **FIRE OR ELECTRICAL HAZARD**

Failure to follow the safety warnings exactly could result in serious injury, death, or property damage.

A fire or electrical hazard may result causing property damage, personal injury or loss of life.

## Furnace Weights

WE30B4D Models – 81 lbs

## Safety Requirements

1. This electric furnace should be installed in accordance with all national and local building, safety, plumbing, and wastewater codes and requirements; along with all other applicable codes.
2. Refer to the furnace rating plate for the furnace model number.
3. Refer to the dimensions page of this instruction for the duct connector dimensions shown in Figures 6 thru 9. The duct connector must be installed according to the instructions in this manual.
4. Provide clearances from combustible materials as listed under **Clearances to Combustibles.**
5. Provide clearances for servicing ensuring service access is allowed for the control box, electric elements and the blower.
6. Failure to carefully read and follow all instructions in this manual can result in malfunction of the furnace, death, personal injury, and/or property damage.
7. Check the rating plate and the power supply to be sure the electrical characteristics match.
8. Electric furnace shall be installed so the electrical components are protected from water.
9. Installing and servicing heating/cooling equipment can be hazardous due to electrical components.
10. Only trained and qualified personnel should install repair or service heating/cooling equipment. Untrained service personnel can perform basic maintenance functions such as cleaning of exterior surfaces and replacing the air filters. Observe all precautions in the manuals and on the attached labels when working on this appliance.
11. These instructions cover minimum requirements and conform to existing national standards and safety codes. In some instances these instructions exceed certain local codes and ordinances, especially those who have not kept up with changing mobile home, modular home and HUD construction practices. These instructions are to be followed and are the minimum requirement for a safe installation.

## Inspection

As soon as the furnace is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing. Before installing the furnace you should check the cabinet for screws or bolts which may have loosened in transit. There are no shipping or spacer brackets which need to be removed before start up.

Also check to be sure all accessories such as heater kits, and coils are available. Installation of these accessories should be accomplished before the furnace is set in place or the connecting of the wiring, electric heat, ducts or piping.

**Codes**

The furnace must be installed in accordance with the following codes.

- Standard for the Installation of Air Conditioning and Ventilating Systems (NFPA 90A)
- Standard for the Installation of Warm Air heating and Air Conditioning Systems (NFPA 90B)
- National Electrical Code (NFPA 70)
- Canadian Electrical Code, Part I (CSA C22.1)
- All local codes (State, City, and Township)

NOTE: All applicable codes take precedence over any recommendation made in these instructions.

**SECTION III: RETURN AIR AND CLEARANCE REQUIREMENTS**

Access for servicing is an important factor in the location of any furnace. Provide a minimum of 24 inches in front of the furnace for access to the control box, heating elements, and blower. This access may be provided by a closet door or by locating the furnace so that a wall or partition is not less than 24 inches from the front access door.

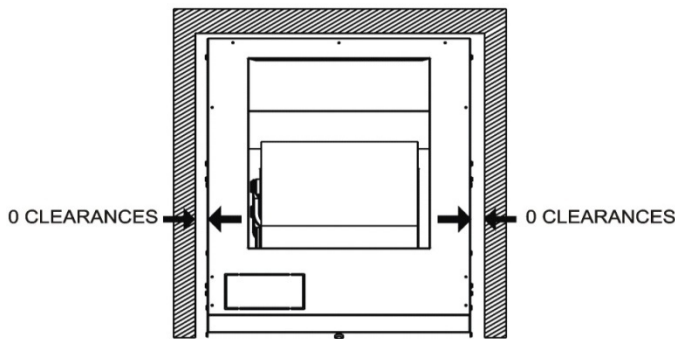
**Furnace Clearances**

This furnace is approved for zero (0 inches) clearance to combustible material on any part of the furnace exterior and the inlet or outlet ducts. Refer to Table 4 for clearance to combustibles information.

**CLEARANCES**

MODEL	TOP (in)	BACK (in)	SIDES (in)	FRONT OF FURNACE		
				ALCOVE (in)	CLOSET (in)	DUCT (in)
ALL	6	0	0	18	6	0

**Table 4: Clearances to Combustibles**



**Figure 2: Closet Clearances**

**Return Air**

In order for the furnace to work properly, a closet or alcove must have a certain total free area opening for the return air.

**For A/C and HP Furnaces (1/3 HP Blower)**

- Minimum 200 in<sup>2</sup> free area opening
- Use Return Grille or Coil Cabinet

**For A/C and HP Furnaces (1/2 HP Blower)**

- Minimum 250 in<sup>2</sup> free area opening
- Use Return Grille, A/C Coil Cabinet, or any return grille with a minimum 250 in<sup>2</sup> free area opening

**For A/C and HP Furnaces (3/4 HP Blower)**

- Minimum 390 in<sup>2</sup> free area opening
- Use Return Grille, or A/C Coil Cabinet, or any return grille with a minimum 390 in<sup>2</sup> free area opening

**Top Return Only – Recommended Grille Size**

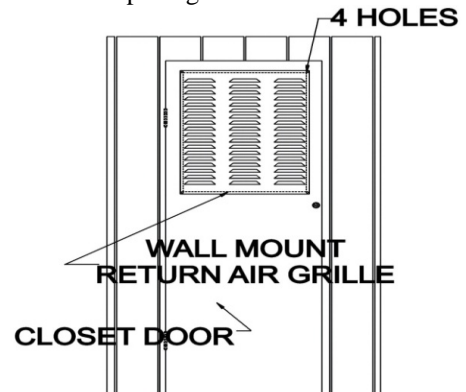
- 800 CFM – 20 X 20 Grille – 324 in<sup>2</sup>
- 1000 CFM – 20 X 25 Grille - 414 in<sup>2</sup>
- 1200 CFM – 25 X 25 Grille - 414 in<sup>2</sup>

- 1400 CFM – 25 X 30 Grille - 644 in<sup>2</sup>
- 1600 CFM – 25 X 30 Grille - 644 in<sup>2</sup>
- 1800 CFM – 30 X 30 Grille - 784 in<sup>2</sup>

**Louvered Door and Top Return – Recommended Grille Size**

- 800 CFM – 10 X 20 Grille – 144 in<sup>2</sup>
- 1000 CFM – 12 X 20 Grille -180 in<sup>2</sup>
- 1200 CFM – 14 X 20 Grille - 216 in<sup>2</sup>
- 1400 CFM – 18 X 20 Grille - 288 in<sup>2</sup>
- 1600 CFM – 18 X 20 Grille - 288 in<sup>2</sup>
- 1800 CFM – 20 X 20 Grille - 324 in<sup>2</sup>

The return air opening can be located in a closet front door or a side wall above the furnace casing, or in a louvered door on the furnace. If opening for the return air is located in the floor, side walls, or closet door anywhere below the furnace casing height, a 6 inch minimum clearance must be provided on the furnace side where the return is located to provide for proper air flow. The 6 inch minimum clearance is not required if there is a return grille installed above the furnace with the sufficient return air opening.



**Figure 3: Typical Closet Installations**

Provisions shall be made to permit the air in the rooms and the living spaces to return to the furnace. Failure to comply may cause a reduction in the amount of return air available to the blower, causing reduced air flow resulting in improper heating of the living space. The reduced air flow may cause the furnace to cycle on the limit causing premature heating element failure.

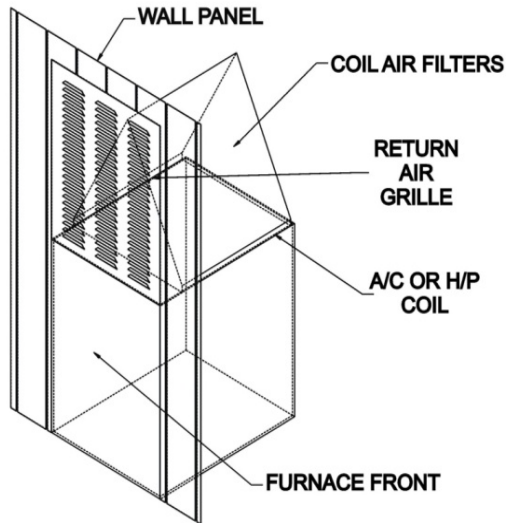


Figure 4: Typical Alcove Installations

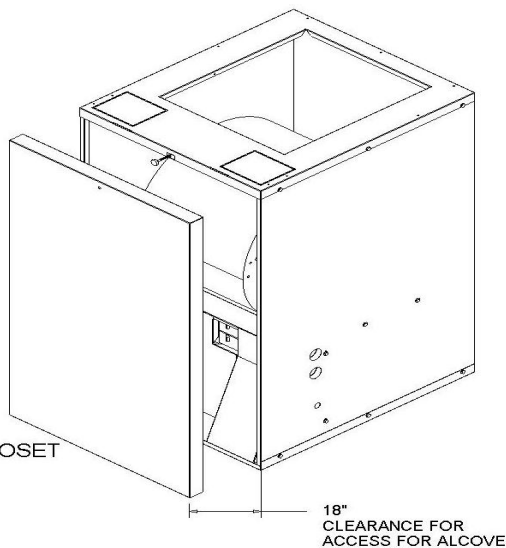


Figure 5: Clearance – Access for Service

**Air Distribution System**

The furnace is designed to operate at a 0.30 inch WC static pressure. In order to assure proper air flow through the furnace the duct distribution system must be designed so that the external static pressure from the furnace, thru the duct system must not exceed 0.30 inch WC. It is recommended you review the manual “**Manufactured Housing Duct Systems Guide to Best Practices**” by Manufactured Housing Research Alliance (MHI-MHRA) before selecting the air distribution system you are going to use.

**SECTION IV: SUPPLY AIR AND DUCT CONNECTOR INSTALLATION**

**Duct Connectors**

**90-DCU0-XX Duct Connectors**

The duct connector is used to provide a sealed connection between the furnace base and a under the floor duct system. The duct connector allows the furnace to be installed on a combustible floor without the use of a separate sub base providing insulation is placed between the duct connector and the combustible floor. Table 5 indicates the duct connector needed for your application.

DEPTH FROM FLOOR TO DUCT	DUCT CONNECTOR NODEL NUMBER
1"	90-DCUO-01
2"	90-DCUO-01
3"	90-DCUO-01
4"	90-DCUO-01
5"	90-DCUO-02
6"	90-DCUO-02
7"	90-DCUO-02
8"	90-DCUO-02
9"	90-DCUO-03
10"	90-DCUO-03
11"	90-DCUO-03
12"	90-DCUO-03

Table 5: Duct Connectors

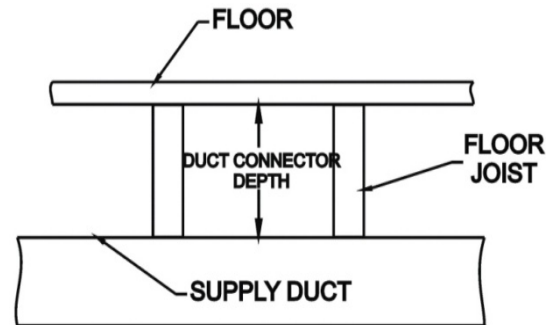


Figure 6: Duct Connector Depths

**⚠ WARNING**

Duct connector can be installed on combustible flooring, **except carpeting**. It is recommended to use insulation having a rating of R-12 or higher is used between the floor base and the combustible floor.

The use of insulation with a rating of R-12 or higher between the floor base and a combustible floor is a precautionary measure to prevent the combustible floor from getting to warm. The use of R-12 insulation between the duct connector and the floor is not a requirement.

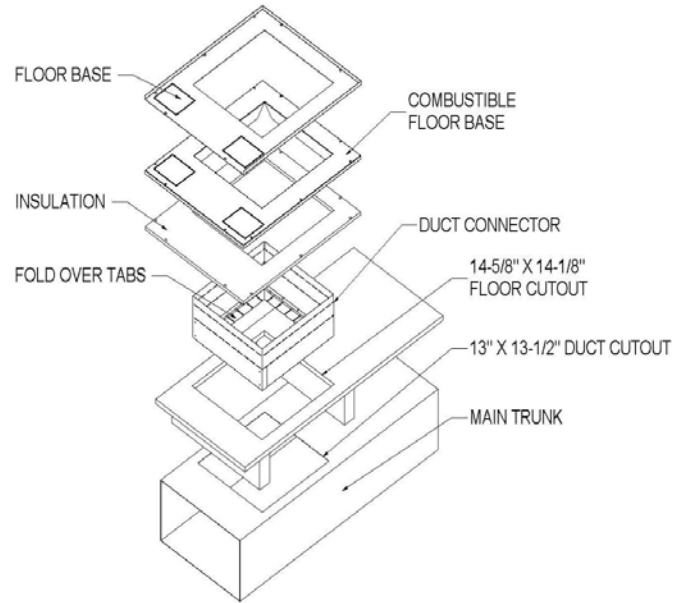
### Installing the Duct Connector

1. Attach the four (seal strip) foam tape gaskets provided with the duct connector alongside the perimeter of the duct opening to seal the duct connector where it attaches to the top of the duct as shown in Figures 7, 8 and 9.
2. Insert the duct connector thru the opening in the floor and attach the duct connector to the top of the duct by inserting the tabs through the opening in the top of the duct and bending the tabs back 90 degrees against the inside of the duct, so the top of the duct is securely fastened to the duct connector. Be sure the seal strip has sealed the area around the duct connector where it attaches to the duct.
3. Slit the corners of the duct connector that extend above the floor, and then bend the sides onto the floor surface. Refer to Figures 7, 8 and 9.
4. It is recommended to place insulation with a rating of R-12 or higher between the floor base and the floor when used on a combustible floor. The use of insulation between the duct connector and a combustible floor is not a requirement, it is a precautionary measure to guard against the combustible floor from getting too warm. If insulation is used, be sure to cut the insulation around the perimeter of the duct connector opening.
5. Install the floor base over the floor opening with the flanges on the 11 x 13 inch opening facing down. Refer to Figures 8 and 9.
6. Locate the four (4) screws provided with the duct connector kit and install the four screws through the four holes provided in the floor base to secure the floor base to the floor.

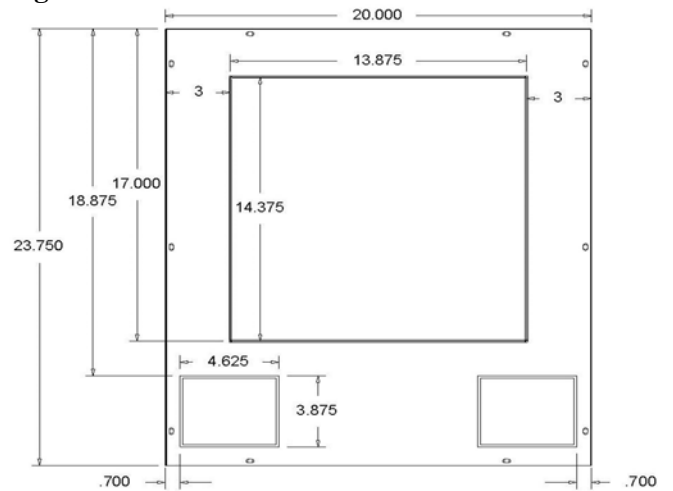
The duct connector is designed for use on ducts wider than 12 inches. When using the connector on smaller width ducts, there will not be sufficient clearance to bend the tabs on two sides of the duct connector. This furnace is designed to be installed on an existing duct connector.

In such cases the tabs may be attached to the sides of the duct by using sheet metal screws or other suitable fasteners. Place holes in the tabs for sheet metal screws by drilling the required screw holes in three (3) tabs on each side of the duct connector. If more than three tabs need to be used to provide a more secure and air tight connection, then drill the remaining tabs so the additional tabs can also be fastened to the duct with screws. Use a duct sealer to seal any air leaks between the duct and the duct connector.

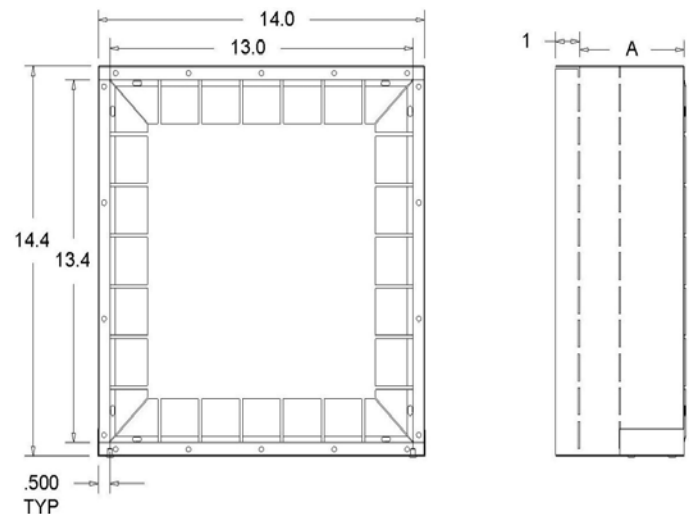
Tape can be used to provide a better air seal. The tape should be a type approved by applicable national or local codes.



**Figure 7: Duct Connector and Floor Base Installation**



**Figure 8: Duct Connector Measurements**



**Figure 9: Duct Connector Installation in the Floor**

## SECTION V: FURNACE INSTALLATION

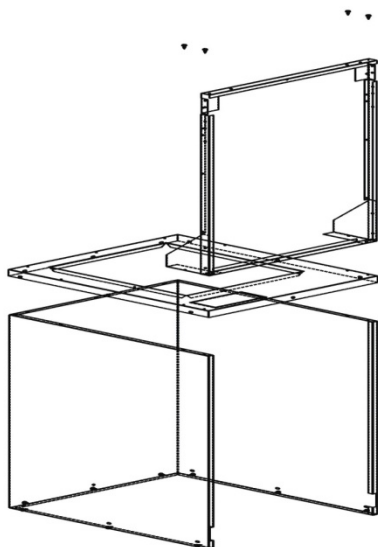
### Installing the Furnace with a Return Air Grille Frame Assembly

#### Alcove Installation

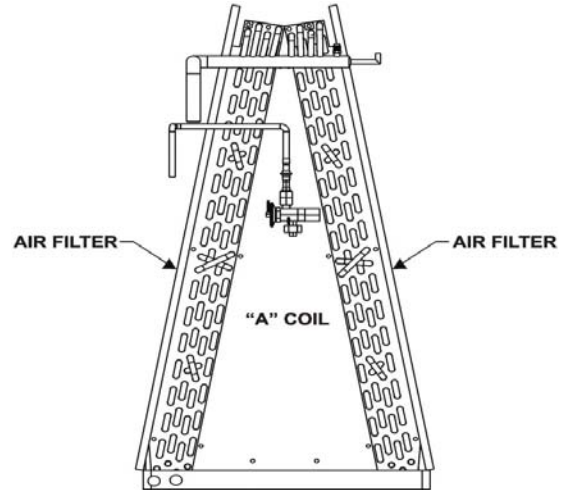
This kit is approved for use in an alcove – heating only installation without an air conditioning coil. The return air grille frame assembly is available in 18” height and 24” height. To install the return air grille frame assembly to the furnace, follow the steps below:

Prior to installing the furnace make sure the holes are cut into the floor for the refrigerant tubing, the electrical wiring are in place, the thermostat wiring and the condenser control wiring should be in place.

1. Before installing the return air grille frame on the furnace, be sure you have enough clearance to install the furnace and the return air grille assembly.
2. Remove the top shipping cover and corner posts.
3. Remove the front access panel (door).
4. Remove the return air grille frame assembly from the box.
5. Set the return air grille frame assembly on the top-front part of the furnace. Be sure to line up the screw holes in the frame with the screw holes in the furnace top cover as shown in Figure 10.
6. Insert the screws provided with the louvered door assembly through the holes in the louvered door frame and into the holes in the furnace top cover.
7. Tighten the screws to secure the louvered door frame assembly to the top cover of the furnace.
8. Remove the bottom shipping cover.
9. Slide the furnace on to the floor base. Push the furnace back until the furnace casing is against the rear flange.
10. Secure the furnace to the floor by drilling two holes through the furnace base and the floor base at the right and left front inside corners of the cabinet. Use two screws to secure the furnace to the floor.



**Figure 10: Return Air Grille Frame Assembly**



**Figure 11: Return Air Filter Frame Assembly  
Installing the Furnace and Coil Cabinet**

#### Closet Installation

This kit is approved for use in an alcove or closet installations with an approved air conditioning coil. The coil cabinets are available in 23.25”, 30.50” and 41.25” height. The furnace is 33” in height making the total furnace and coil cabinet heights 56”, 63” and 73”. To install the coil cabinet assembly to the furnace, follow the steps below:

Prior to installing the furnace make sure the holes are cut into the floor for the refrigerant tubing, the drain line, the electrical wiring, the thermostat wiring and the condenser control wiring.

1. Before installing the coil cabinet on the furnace, be sure you have enough clearance to install the furnace and the filter door assembly.
2. Remove the top shipping cover and corner posts.
3. Remove the bottom shipping cover.
4. Remove the front access panel (door) and lay the furnace on its back.
5. Remove the coil cabinet from the box and assemble per the instructions.
6. Lay the coil cabinet on its back and place the coil cabinet flanges against the furnace top cover.
7. Install the screws through the holes provided in order to secure the cooling coil cabinet to the top of the furnace.
8. Slide the furnace on to the floor base. Push the furnace back until the furnace casing is against the rear flange.
9. Secure the furnace to the floor by drilling two holes through the furnace base and the floor base at the right and left front inside corners of the cabinet. Use two screws to secure the furnace to the floor.

## SECTION VI: UPFLOW CONFIGURATION

This kit is approved for use in an alcove or closet installations with an approved air conditioning coil. The upflow coil cabinets are available in a 28" and 36" height. The upflow configuration requires either a 20" tall return air cabinet or a 24" tall return air cabinet under the coil cabinet making the total height of the furnace, coil cabinet and return air cabinet heights 81" or 93". To install the coil cabinet assembly and the return air assembly follow the steps below.

Prior to installing the furnace make sure the holes are cut into the floor for the refrigerant tubing, the drain line, the line voltage supply wiring, the thermostat wiring and the condenser control wiring.

1. Before installing the coil cabinet on the furnace, be sure you have enough clearance to install the furnace, the coil cabinet and the return air cabinet.
2. Remove the top shipping cover and corner posts.
3. Remove the bottom shipping cover.
4. Remove the front access panel (door).
5. Remove the coil cabinet from the shipping box.
6. Place the coil cabinet on top of the furnace and secure with screws.
7. Turn the furnace and coil cabinet upside down to put the furnace and coil cabinet in the up-flow position.
8. Place the return air cabinet at the bottom of the coil cabinet. Use the screws provided in the kit to secure the return air cabinet to the coil cabinet.
9. Slide it into position on the supply air duct connector. Use the duct collar to secure the supply air duct to the top of the furnace. Be careful when installing the duct collar not to use pointed screws in the control box and make sure no screws are touching any components or wires.
10. Place the cooling coil into the coil cabinet. Follow the instructions provided with the outdoor cooling unit and the evaporator coil to properly connect the refrigerant piping to the evaporator coil and the drain lines to the condensate drain pan. Make sure the coil and drain pan are all the way to the back in the cabinet so the hole in the center of the drain pan lines up with the hole in the center of the coil cabinet.
11. Place the cooling cabinet front door on the unit by inserting the tabs in the bottom of the door into the slots in the coil shelf, line up the strike in the front flange of the top cover and push the two strikes into the both latches on the front flange on the door.  
  
NOTE: The installer must provide a strap that attaches to the top of the furnace and is secured to the alcove or closet wood framing
12. The 24" tall return air cabinet requires two standard 16" x 16" x 1" and one 24" x 24" x 1" disposable air filters in the filter tracks located inside the return air cabinet.
13. The 20" tall return air cabinet requires two standard 18" x 18" x 1" and one 18" x 20" x 1" disposable air filters in the filter tracks located inside the return air cabinet.

14. Install a louvered grille in the front of the return air cabinet.

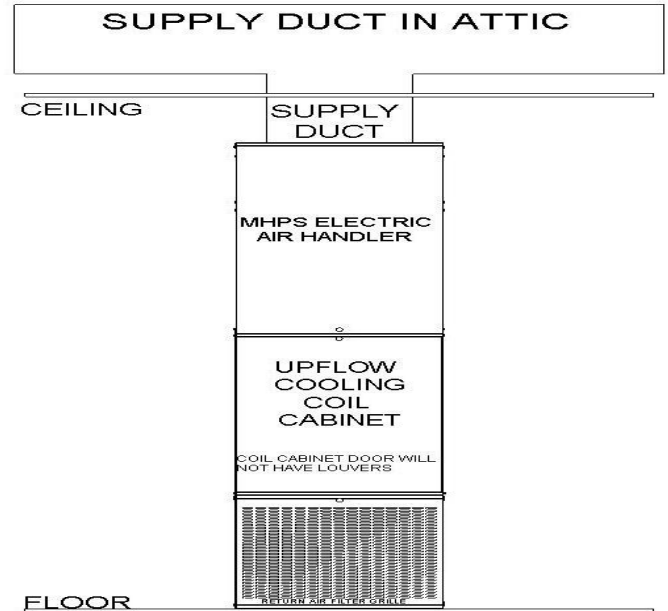


Figure 12: Typical Upflow Installation

## SECTION VII: LINE VOLTAGE WIRING

### Power Supply

The furnace internal wiring is complete except for the power supply and the thermostat wires. See wiring diagram and/or Tables 6 and 7 for wire size, fuse/circuit breaker size, and ground wire sizes. The use of cable connectors on incoming power supply wires to relieve any strain on wiring is recommended. Follow the steps below to connect the power supply wires.

### Single Circuit Line Wiring Connections

1. Remove the control box cover.
2. Install the cable connectors on the 7/8" dia holes on the right side of the control box.
3. Strip 1/2" of the insulation on the end of each wire.
4. Insert the wires through the holes in the casing and through the cable connectors.
5. Insert the black wire into the L1 screw terminal on the first circuit breaker from the top and tighten the set screw to clamp down on the wire.
6. Insert the white or red wire into the L2 screw terminal on the first circuit breaker from the top and tighten the set screw to clamp down on the wire.
7. If you are using a single circuit for a 12kW, 15kW or 20kW model you will need to install a black jumper wire from the L1 terminal on circuit breaker #1 to the L1 terminal on circuit breaker #2 and a white or red jumper wire from the L2 terminal on circuit breaker #1 to the L2 terminal on circuit breaker #2. Refer to Figure 14 for circuit breaker locations.

Note: The 100-amp 4 Pole Jumper Bar Assembly part number 68BAE001 can be used in place of the jumper wires.

- Insert the green wire into the ground lug and tighten the set screw.

**Dual Circuit Line Wiring Connections: 12kW, 15kW or 20kW Models**

- You will need to insert the black wire from the second power supply into the L1 screw terminal on the second circuit breaker down from the top and tighten the set screw to clamp down on the wire.
- You will need to insert the white or red wire from the second power supply into the L2 screw terminal on the second circuit breaker down from the top and tighten the set screw to clamp down on the wire.
- You will need to insert both green wires into the ground lug and tighten the set screw.
- Tighten the screws on the cable connectors until the power supply wires are securely fastened to the connector.

**NOTE:** The furnaces are equipped with either one or two circuit breakers. These circuit breakers protect the wiring inside of the furnace in the event of a short circuit. Additionally, these breakers provide a means of disconnecting the power to the unit. The circuit breakers in the furnace are not meant to protect the branch circuit wiring between the

furnace and the home's breaker panel. General wire and breaker sizes are shown in Tables 6 and 7. If sheathed cable is used, refer to NEC National Electrical Code (NFPA 70) or the Canadian Electrical Code, Part I (CSA C22.1) and local codes for additional requirements concerning supply circuit wiring. Electrical data can be found in Tables 6, 7, and 8.

**IMPORTANT** - All installation on field wiring must be rated at 60°C or higher. Please refer to the wiring diagrams on the furnace or this book for more information.

The 12kW 15kW and 20kW models may be connected to a single or dual branch circuit.

**IMPORTANT** - Refer to the NEC National Electrical Code (NFPA 70) or the Canadian Electrical Code, Part I (CSA C22.1) and local codes for wiring material requirements.

	AIR HANDLER MODELS			
	WE30B4			
10 kW Heater Amps - 208/240 VAC	31.66/41.66			
12 kW Heater Amps - 208/240 VAC	38/50			
15 kW Heater Amps - 208/240 VAC	47.6/62.5			
20 kW Heater Amps - 208/240 VAC	63.33/83.33			
Indoor Blower Type	Constant Torque			
Indoor Blower Amps	3.20			
Circuit Load - FLA - 240 VAC	44.87	53.20	65.70	86.53
Heater - kW	10	12	15	20
Min. Wire Size (90°C)	#6	#4	#3	#4
Minimum Wire Size (75°C)	#6	#4	#3	#3
Minimum Wire Size (60°C)	#4	#4	#2	#2
Ground Wire Size	*	*	*	*
Max Fuse/Circuit Breaker Amps	60	70	90	125

**Table 6: Wiring Requirements – Single Branch Circuit**

10kW Single Stage model can only be wired as a single power supply.

Single power supply will require circuit breaker jumper bar or a jumper wire.

+ Refer to the National Electrical Code Table 250-95 for Non-Sheathed Conductor Ground Wire.

\* Ground conductor **must be the same size and temperature rating** as the other conductors listed in Table 6.

**Indoor Blower Amps are the tested blower motor amps, not FLA. The FLA's are: 1/3 HP is 2.8A, 1/2 HP is 4.1A and 3/4 HP is 6.0A**

AIR HANDLER MODELS						
WE30B4						
12 kW Heater Amps - 208/240 CAC	43.88/50					
15 kW Heater Amps - 208/240 VAC	54.84/62.5					
20 kW Heater Amps - 208/240 VAC	N/A					
Indoor Blower Type	Constant Torque					
Indoor Blower Amps	3.20					
Total Electric Heater kW	12		15		20	
Circuit Number	1	2	1	2	1	2
Circuit Load - FLA - 230 VAC	28.20	25.00	44.87	20.83	44.87	41.67
Heater - kW	6	6	10	5	10	10
Min. Wire Size (90°C)	#8	#8	#6	#10	#6	#8
Minimum Wire Size (75°C)	#8	#8	#6	#10	#6	#8
Minimum Wire Size (60°C)	#8	#8	#4	#10	#4	#6
Ground Wire Size	*	*	*	*	*	*
Max Fuse/Circuit Breaker Amps	40	35	60	30	60	50

**Table 7: Wiring Requirements – Dual Branch Circuit**

12kW, 15kW, and 20kW Two Stage models may have a dual or single power supply.

Single power supply will require circuit breaker jumper bar or a jumper wire.

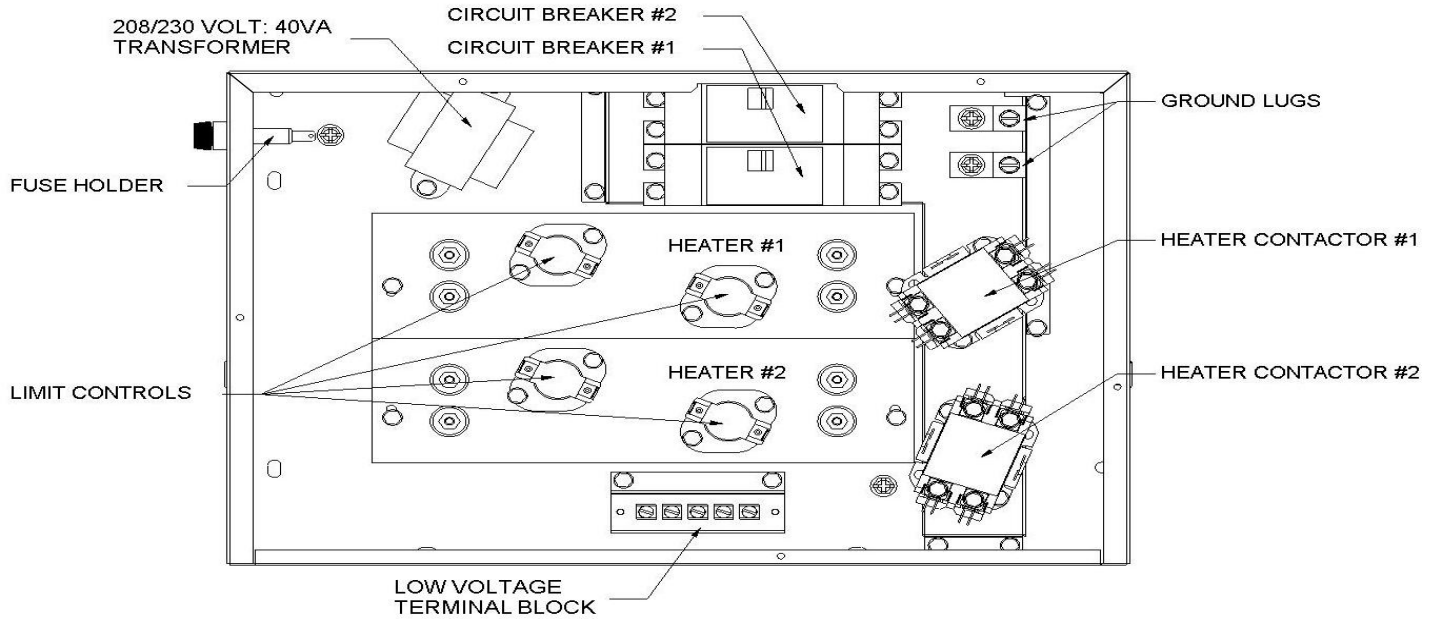
+ Refer to the National Electrical Code Table 250-95 for Non-Sheathed Conductor Ground Wire.

\* Ground conductor **must be the same size and temperature rating** as the other conductors listed in Table 7.

**Indoor Blower Amps are the tested blower motor amps, not FLA. The FLA's are: 1/3 HP is 2.8A, 1/2 HP is 4.1A and 3/4 HP is 6.0A**

		10 kW	12 kW		15 kW		20 kW		
		BRANCH		CIRCUIT					
		1	1	2	1	2	1	2	
240 VAC, 60 HZ, 1 PH	BTU	34,121	20,439	20,439	34,121	17,061	34,121	34,121	
	kW	10.00	5.99	5.99	10.00	4.99	10.00	10.00	
230 VAC, 60 HZ, 1 PH	BTU	31,803	19,051	19,051	31,803	15,902	31,803	31,803	
	kW	9.32	5.58	5.58	9.32	4.65	9.32	9.32	
220 VAC, 60 HZ, 1 PH	BTU	29,520	17,683	17,683	29,520	14,760	29,520	29,520	
	kW	8.65	5.18	5.18	8.65	4.32	8.65	8.65	
HEATING ELEMENT CAPACITY	BTU	34,121	20,439	20,439	34,121	17,033	34,121	34,121	
	kW	10.00	5.99	5.99	10.00	4.99	10.00	10.00	

**Table 8: Electrical Data**

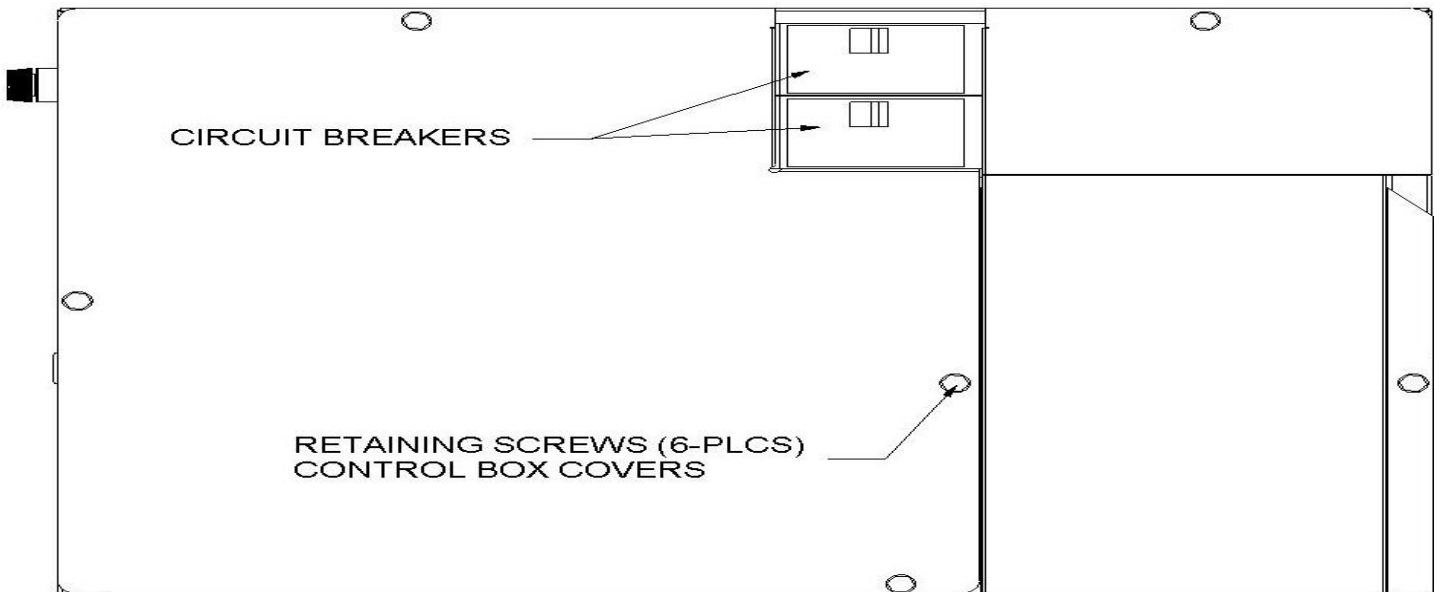


**Figure 13: Control Box Component Locations**

Casing or cabinet must be permanently grounded in accordance with the National Electrical Code or other applicable codes.

**⚠ WARNING**

For personal safety be sure to turn the electrical power “OFF” at the main circuit panel (Home Circuit Breaker Box) and at the control box circuit breakers before attempting any service or maintenance operations. Homeowners should never attempt to perform any maintenance which requires opening the furnace control box door. Refer to Figure 14.



**Figure 14: Control Box Cover and Circuit Breaker Location – Dual Element Box**

## SECTION VIII: FIELD INSTALLED ELECTRIC HEATER KITS

This instruction covers the physical installation of the following electric heat kits on the WE30 series models. Refer to Tables 6-8 for electrical specifications.

Field Installed Electric Heat Kit				
Model No.	Voltage	Phase	Hertz	Heater kW
BE30HK-10A	208-240	1	60	10
BE30HK-12A	208-240	1	60	12
BE30HK-15A	208-240	1	60	15
BE30HK-20A	208-240	1	60	20

**Table 9: Field Installed Electric Heater Kit Model Numbers.**

The field installed electric heat accessories are used on cooling or heat pump models that were not purchased with electric heat from the factory. Each air handler model is approved for use with the field installed accessory electric heat kit.

### INSTALLING THE HEATERS

1. Follow the instructions in the USERS INFORMATION MANUAL to properly shut down the air handler.
2. Remove the block off plate that covers the heater openings and discard. Retain the screws; they will be used to secure the electric heater mount plate.
3. Insert electric heat kit into the opening where the block off plate was removed. Secure the mounting plate with the screws that were removed from the block off plate.
4. Connect the six-pin male plug on the electric heater assembly to the six-pin female plug mounted on the side of the low voltage control box divider panel.
5. Remove the wiring diagram from the kit, remove the paper that covers the adhesive back and place the electric heat wiring diagram over the wiring diagram located on the blower housing.
6. Follow the instructions in the USERS INFORMATION MANUAL to properly start up the air handler.

## ⚠ CAUTION

To prevent damage, carefully insert the electric heating assembly through the rectangular opening in the front of the discharge opening so the heat element support rod is seated into the hole on the back side of the discharge opening.

## ⚠ CAUTION

After installing the electric heater, a one-inch clearance must be maintained on all sides of the supply air duct and/or plenum for a minimum of thirty-six inches from the air handler discharge opening.

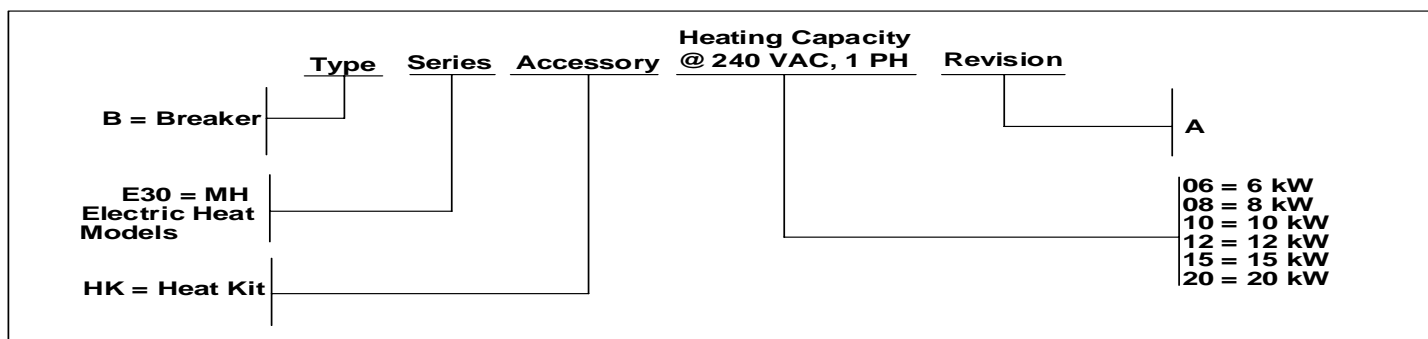
### POWER SUPPLY CONNECTIONS

If the air handler has been installed prior to installing the electric heaters or if an older unit is being replaced, the supply power wires must be checked to make sure the wires are the proper sizes to handle the current load for the heaters. Refer to Tables 6-8 for correct wire size. If the supply power wire size is incorrect, new wires will need to be installed. Follow the instructions "Power Supply Wiring" on page 8 of these instructions for proper installation.

**For circuit breaker models only** - After the supply wiring has been connected to the circuit breakers you must remove the transformer and indoor blower motor wires from the terminal block and connect them to load side of circuit breaker #1.

### LOW VOLTAGE CONNECTIONS

If the air handler was previously installed, nothing will need to change on the low voltage wiring. If this is a new installation refer to SECTION VII on page 12 of these instructions.



**Table 10: Field Installed Electric Heater Kit Nomenclature**

## SECTION IX: THERMOSTAT WIRING AND CONNECTIONS

### Thermostat Wiring

Thermostat wires connect through side of furnace and should be no smaller than 24 gauge. Refer to Table 11 for recommended wire gauge, lengths and maximum current for each wire gauge.

Maximum Wire Length	Thermostat Wire Gauge	Thermostat Wire Maximum Current
0 - 112 Feet	18	3.0 Amps
0 - 70 Feet	20	3.0 Amps
0 - 30 Feet	22	3.0 Amps

**Table 11: Low Voltage Wire Gauge and Max Lengths**

**NOTE:** There is a 3 Amp slow blow bar fuse located in the control box that protects the 24 VAC circuit. Replace this fuse only with the equivalent 3 Amp fuse.

Power wires can enter through the side of the unit or through the auxiliary entrance, located in the bottom of the unit.

When bringing wiring through the bottom of the furnace, cable connectors must be installed to hold wiring in place and to relieve any strain on the wiring.

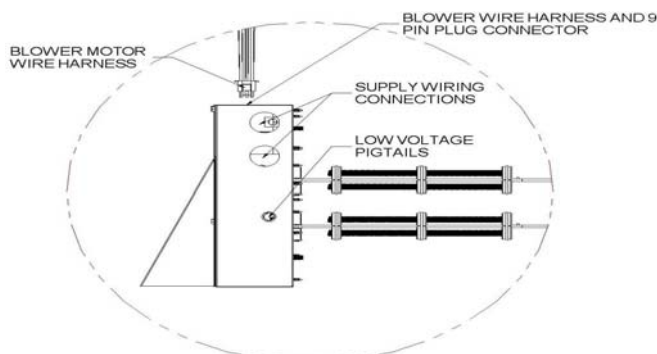
These connectors will also serve as a seal between the furnace and the floor. Thus, additional sealing is not required.

The use of a five-conductor cable from the thermostat to the furnace is recommended for typical heating or heating/cooling installations with a two or three-conductor cable from the furnace to the condenser. The thermostat wire colors and the typical heating/cooling connections are listed in Tables 12 and 13.

A seven-conductor cable from the thermostat to the furnace is recommended for a typical heat pump installation with a five-conductor cable from the furnace to the condenser.

The thermostat wire colors and the typical heat pump heating/cooling connections are listed in Tables 12 and 13.

**NOTE:** If the thermostat cable is on the left side of the furnace move the grommet in the 3/8" hole on the left side of the furnace casing to the 3/8" hole on the right side of the furnace casing. Run the thermostat wire cable through the control box to the low voltage control box. Place the thermostat wire next to the low voltage terminal block. Attach the strain relief to the control box. Do not attach the strain relief to the furnace casing because the sheet metal is too thin.



**Figure 15: Control Box Power, Low voltage wire Locations**

### Thermostat Installation

The thermostat heat anticipator must be set at 0.7 Amps if the thermostat has a manual heat anticipator adjustment. This setting should be checked at the time of installation.

The thermostat may be a "self-setting" type in which case no heat anticipator setting will be found on the thermostat, eliminating the need for any field adjustment.

Thermostat should be located on an inside wall in an open area to more closely regulate average room air, preferably, where there is air movement back to furnace. Locating height of thermostat is important. Thermostat should be located preferably in a hall way upstream from the furnace return airflow, not within three feet of from any windows and 52 to 66 inches above the floor.

**DO NOT** place the thermostat within three feet of any of the furnace supply air registers

**DO NOT** place the thermostat within three feet of any of the air conditioner supply air registers

Maintenance, operating and/or programming instructions are in the envelope accompanying the thermostat. Give the envelope to the home owner.

### CAUTION

Do not locate thermostat within three feet of any of the following items:

- 1 Furnace supply air registers
- 2 Cooling unit supply air registers
- 3 Lights or heat lamps
- 4 Aquariums
- 5 Televisions, stereo, amplifiers, surround sound systems
- 6 Stoves or any cooking appliance
- 7 Refrigerator
- 8 Washer and/or dryer
- 9 Hot water tank
- 10 Sink or near any hot water
- 11 Within 15 feet of any electric space heater
- 12 Within two feet of any sunlight

### Separate Heating and Cooling System; Same Thermostat

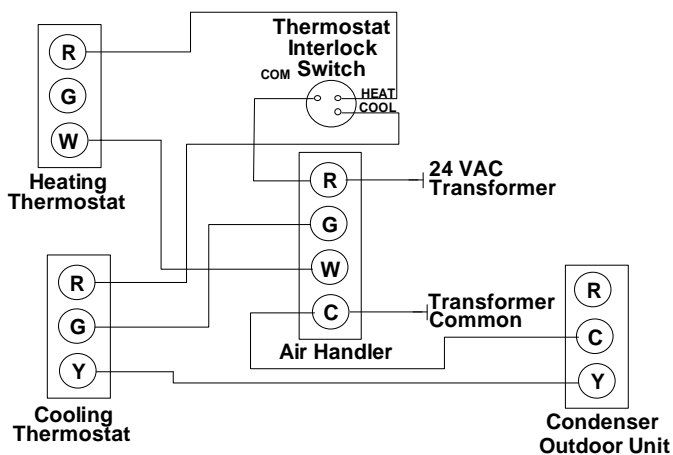
If the furnace and the cooling unit have separate transformers be sure to use a thermostat with isolated heating and cooling contacts "RC" and "RH" to prevent interconnection of Class II 24 Volt Systems Refer to Figures 18 and 19. Cycle furnace and the air conditioner separately to make sure it will operate correctly.

Most new thermostats have separate heating and cooling contacts for use with homes that have a furnace and air conditioner that are completely separate and each have a 24 VAC transformer for system control. These thermostats have a "RC" terminal for cooling and a "RH" terminal for heating. Connect the cooling unit red wire from the "R" terminal on the outdoor unit to the "RC" terminal on the thermostat and the RED furnace pigtail wire to the "RH" terminal on the thermostat. Refer to Figures 18 and 19 for typical low voltage wire connections.

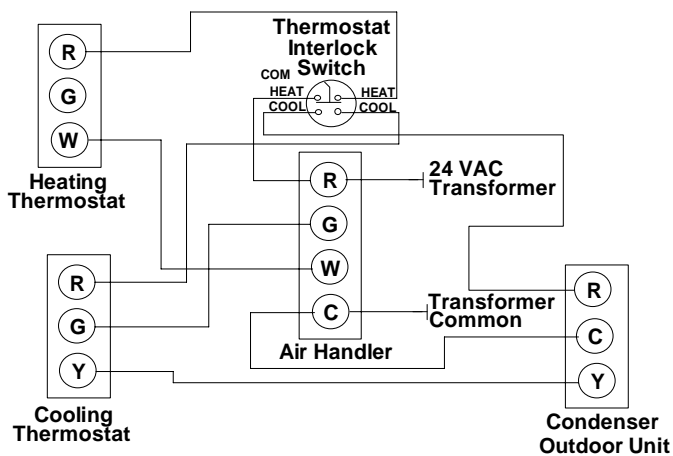
If you have separate furnace and air conditioner with separate transformers and your thermostat does not have the "RC" and "RH" terminals it is recommended that you purchase a new thermostat. If the furnace and air conditioner are both connected to the thermostat "R" terminal it can cause transformer burnout or it can cause either the furnace or air conditioner control system to go into lockout.

### Separate Heating and Cooling Units, Separate Thermostats

If the heating/cooling system in your house is a central heating and cooling system using the furnace transformer but the furnace and the cooling unit are controlled by separate thermostats then the use of a thermostat interlock switch is required in order to prevent the furnace and the air conditioner from operating at the same time. Refer to Figures 16 and 17.



**Figure 16: Separate Thermostats; Separate Air handler and Cooling Unit**

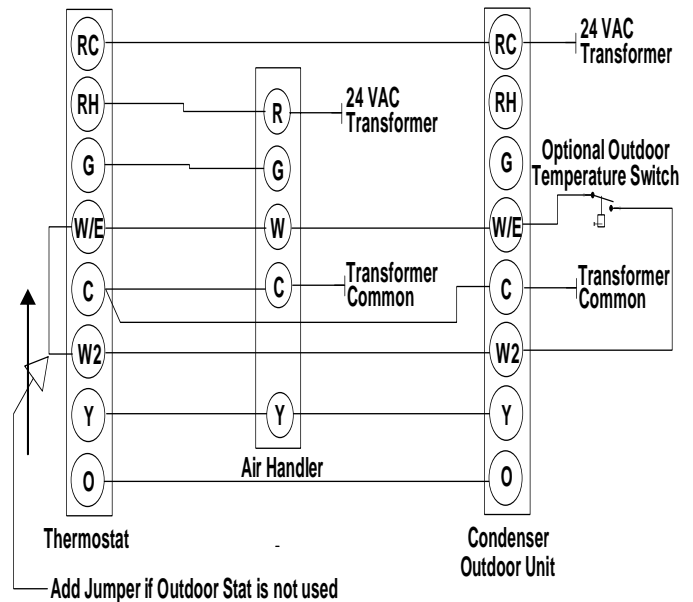


**Figure 17: Separate Thermostats; Separate Transformers, Separate Air handler and Cooling Unit**

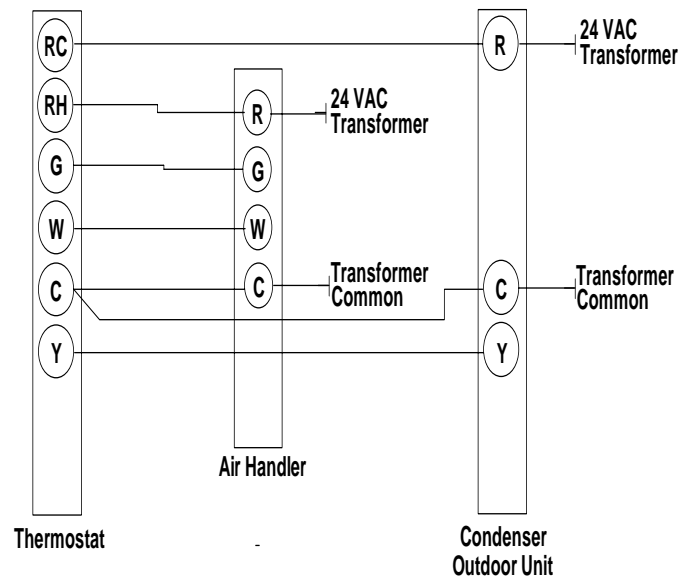
## ⚠ CAUTION

When using separate thermostat, a thermostat interlock system must be provided to prevent simultaneous operation of the air handler and air conditioner. Simultaneous operation can result in equipment overheating, equipment damage, and wasted energy.

**Do Not** connect the Yellow wire to the thermostat unless an outdoor unit is installed.



**Figure 18: Same Thermostat; Separate Air handler and Heat Pump Unit with separate transformers**



**Figure 19: Same Thermostat; Separate Air handler and Cooling Unit with separate transformers**

Wire Color	Description	Letter Code	Air Handler Pig Tail Wire Color	Thermostat Connection	Condenser Connections
RED	24 VAC	R	Red	R	N/A
WHITE	HEAT (1st Stage Heat)	W	White	W or W1	N/A
GREEN	Indoor Fan	G	Green	G	N/A
YELLOW	Cooling - Stage 1	Y	Yellow	Y or Y1	Y or Y1
BROWN	24 VAC Common	BRN	Brown	C	C
BLACK	HEAT (Optional 2nd Stage Heat)	BLK	Black	W2	W2

Note: Single stage thermostat on two stage models must connect white (W1) pigtail wire and black (W2) pigtail wire together in low voltage box with W wire from the thermostat.

**Table 12: Recommended Heating / Cooling Thermostat Wire Color Codes and Connections.**

Wire Color	Description	Letter Code	Air Handler Pig Tail Wire Color	Thermostat Connection	Condenser Connections
RED	24 VAC	R	Red	R	N/A
WHITE	HEAT (1st Stage Heat)	W	White	W or W1	N/A
GREEN	Indoor Fan	G	Green	G </td <td>N/A</td>	N/A
YELLOW	Cooling - Stage 1	Y	Yellow	Y or Y1	Y or Y1
BROWN	24 VAC Common	BRN	Brown	C	C
BLACK	HEAT (Optional 2nd Stage Heat)	BLK	Black	W2	W2
ORANGE	Heat Pump Reversing Valve Solenoid	ORN	N/A	O	O
BLUE	Cooling - (Optional 2nd Stage Cooling)	BLU	N/A	Y2	Y2

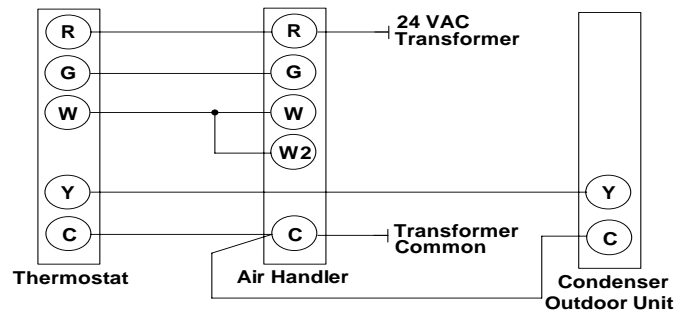
**Table 13: Recommended Heating / Cooling / Heat Pump Thermostat Wire Color Codes and Connections.**

**Typical Heating/Cooling Thermostat Wiring Connections**

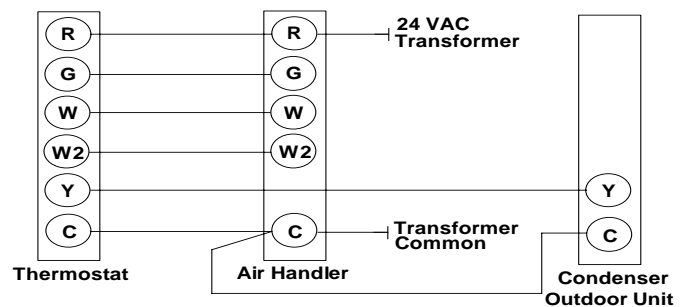
1. Remove lower access door.
2. Remove both control box covers.
3. Install a grommet in the 3/8" hole on the side of the air handler casing to protect the thermostat wire cable.
4. Strip 1/2" of the insulation on the end of each wire.
5. Insert the wire cable from the thermostat through the grommet in the right side of the casing, thru the 3/8" strain relief in the control box and place the thermostat wire cable next to the low voltage terminal block.
6. Connect the Red (24 VAC) supply thermostat wire to the red pigtail wire and secure the two wires with a wire nut.
7. Connect the White (First stage heating) thermostat wire to the white pigtail wire and secure the two wires with a wire nut.
8. Two stage heat is available on the 12 kW, 15 kW and 20 kW models. For two stage heat you connect the black pigtail wire to the 2<sup>nd</sup> stage wire from the thermostat and secure the two wires with a wire nut.
9. Connect the Green (Indoor fan) thermostat wire is connected to the green pigtail wire and the two wires are secured with a wire nut.
10. Connect the Yellow (Air Conditioning) wire from the thermostat and the yellow compressor contactor wire together using a wire nut.
11. Connect the Brown (24 VAC Common) wire from the thermostat to the brown pigtail wire and secure with a wire nut. If cooling is used connect the brown pigtail wire, the thermostat common wire and the common wire from the compressor contactor together and use a wire nut to securely fasten the wire together.

12. If a two-stage outdoor unit is used then connect the "W2" wire from the outdoor unit to the black wires discussed in step 8.

**NOTE:** If single stage thermostat is used on a two-stage air handler you don't need to do anything. The air handler is shipped wired for single stage operation.



**Figure 20: Typical Single Stage Heating/Cooling Digital Thermostat with Two Stage Air handler**

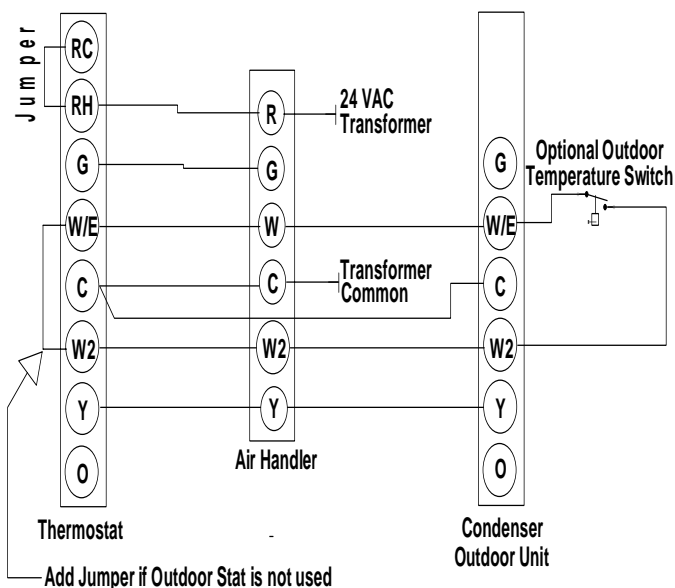


**Figure 21: Typical Two Stage Heating/Cooling Digital Thermostat Connections**

### Typical Heat Pump - Heating/Cooling Thermostat Wiring Connections

1. Remove the lower access panel.
2. Remove the control box cover.
3. Install a grommet in the 3/8" dia hole on the right side of the air handler casing to protect the thermostat wire cable.
4. Strip 1/2" of the insulation on the end of each wire.
5. Insert the wire cable from the thermostat through the grommet in the right side of the casing, thru the 3/8" grommet in the control box and place the thermostat wire cable next to the low voltage terminal block.
6. Connect the Red (24 VAC) supply wire from the thermostat to the red pigtail wire and secure with a wire nut.
7. Connect the White (first stage heating) wire from the thermostat to the white pigtail wire and secure with a wire nut.
8. Connect the Green (indoor fan) wire from the thermostat to the green pigtail wire and secure with a wire nut.
9. Connect the Brown (24 VAC Common) wire from the thermostat, the brown pigtail wire and the common wire from the compressor contactor together and secure all three wires with a wire nut
10. Connect the Orange (Reversing Valve Solenoid) wire from the thermostat with the Orange wire from the "O" terminal on the condenser unit. Fasten the two wires together securely with a wire nut.
11. For 2<sup>nd</sup> stage operation, connect the Black thermostat wire to the black wire and secure with a wire nut.
12. If a two-stage outdoor unit is used then connect the "W2" wire from the outdoor unit to the black wires discussed in step 12 and secure with a wire nut. Refer to Figure 22.

**NOTE:** If single stage thermostat is used on a two-stage air handler connect the black and the white air handler pigtail wires and the white thermostat wire together; then, secure all three wires with a wire nut.



**Figure 22: Typical Heat Pump / 2 Stage Heating / Cooling Connections**

### SECTION X: MOTOR, BLOWER AND FURNACE START UP

**⚠ WARNING**

To avoid personal injury or property damage, make certain that the motor leads cannot come into contact with non-insulated metal components of the unit.

#### Selecting the Constant Torque Blower Speed

This furnace uses the constant torque high efficiency motor. This motor operates on 240 VAC. The motor speed tap is 24 VAC, 60 Hz, 1 PH. High speed can be changed by removing the black wire from the "Y" terminal on the low voltage terminal block (LVTB) and connecting either the blue, orange, or purple wire to the terminal. The heat speed can also be changed by removing the blue wire from the "W" terminal on the LVTB and replacing it with either the purple or orange wire. Table 14 shows the constant torque motor lead connection labeling and the connection definitions. The motor has two plugs that the wires connect to the motor. One plug has C, L, G and N. The other plug has the speed taps 1, 2, 3, 4, and 5. The speed wires must be changed at the LVTB

Terminal	Connection	Color	Wire Gauge
C	Motor Common - 24 VAC Common	Green	22
L	Supply Voltage to the Motor - 240 VAC L1	Black	18
G	Ground Connection	Green	18
N	Supply Voltage to the Motor - 240 VAC L2	White	18
1	Low Voltage Speed Tap - 24 VAC	Red	22
2	Med-Low Voltage Speed Tap - 24 VAC	Orange	22
3	Medium Voltage Speed Tap - 24 VAC	White	22
4	Med-High Voltage Speed Tap - 24 VAC	Blue	22
5	High Voltage Speed Tap - 24 VAC	Black	22

**Table 14: Constant Torque Motor Terminal Connections**

**Total 24 VAC circuit amps are 0.14 amps.**

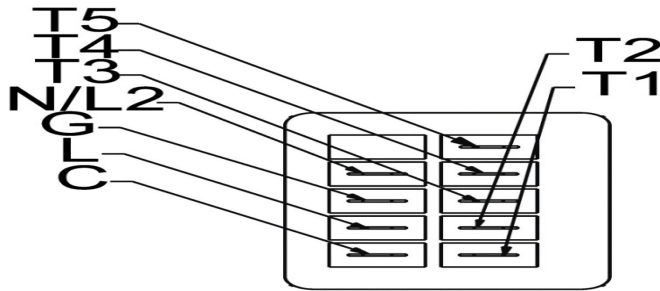
#### Change Motor Speeds

1. Turn off **all** electrical supply circuits to the furnace at the main circuit panel (House Circuit Breaker) panel.
2. Remove furnace front door and switch furnace circuit breaker(s) to "OFF".
3. Remove control box cover.
4. Disconnect the wire from the low voltage terminal block and reconnect the desired wire to the terminal. Refer to Figure 23 and Table 14 for motor connections.

Note: Low speed is reserved for constant circulation. This speed is around 150 CFM. The furnace will not operate at this speed tap.

5. Turn the circuit breakers on and reinstall furnace front door.

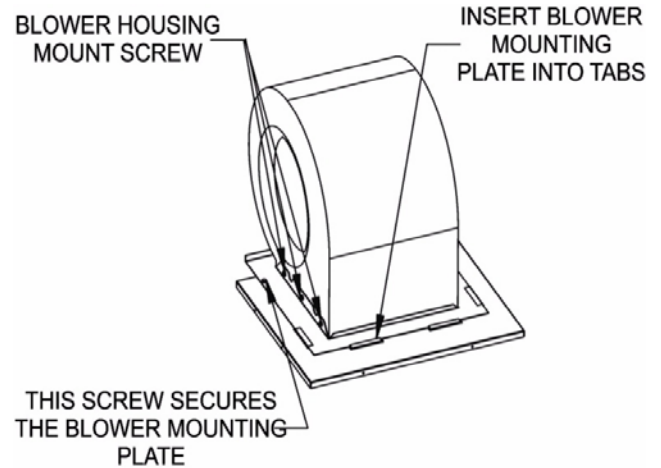
6. Turn on **all** electrical supply circuits to the furnace at the main service (House Circuit Breaker) panel.



**Figure 23: Constant Torque Motor Terminals**

### Replacing the Blower Motor

1. Turn off all electrical supply circuits to the furnace at the main service panel.
2. Remove furnace front door and switch furnace circuit breaker(s) to “OFF”
3. Disconnect the plastic wire plug that has the wires that go to the motor terminals from the control box.
4. Remove the screws on the right side of the blower mounting plate.
5. Slide the blower out of the blower compartment and set on the floor.
6. Remove the wires from the terminals.
7. Remove the blower motor from the mounting bracket by removing the screws on the sides of the blower that secure the blower to the bracket.
8. Insert the new blower motor into the blower mounting bracket and insert the screws.
9. Connect the wires to the same terminals on this motor that they were connected to on the motor that was removed.
10. Slide the blower assembly into the blower deck and insert the screw on the mounting bracket.
11. Connect the pin plug to the mating pin plug on the control box.
12. Switch the circuit breakers to ON and replace furnace front door.
13. Turn on all electrical supply circuits to the furnace at the main circuit panel (House Circuit Breaker.)
14. Set the thermostat to the desired temperature.



**Figure 24: Blower Assembly and Blower Deck**

## SECTION XI: FINAL SYSTEM CHECKOUT

1. Refer to appropriate wiring diagram and recheck all wiring connections. Ensure that all wiring connections are tight.
2. Check blower motor connectors for proper connection.
3. If the control box cover is removed; reinstall control box cover.
4. Switch circuit breaker(s) to “ON” position.
5. Switch the furnace circuit breakers in the main service panel (House Circuit Breaker) to the ON position.
6. Set the blower selector switch to the ON position and check all of the duct connections for air leaks. Seal any leaks found.
7. Set the blower selector switch to the AUTO position.
8. Set the thermostat above the room temperature to check for proper operation of the electric heaters.
9. Set the thermostat to the desired temperature.

### Airflow Guidelines for Proper Heating Operation:

The heating airflow is determined by the number of heaters and the furnace temperature rise. The rule of thumb for electric heaters is 65 CFM per kW of electric heat for cooling and 110 CFM per kW of electric heat for heat pump. Check the CFM Tables in the Users Information and Service and Maintenance Manual.

### Thermostat Heat Anticipator

Some thermostats have a heat anticipator setting that must be set to the settings shown below in order to function correctly. If the heat anticipator setting is too low the furnace will short cycle.

# SECTION XII: WIRING DIAGRAMS

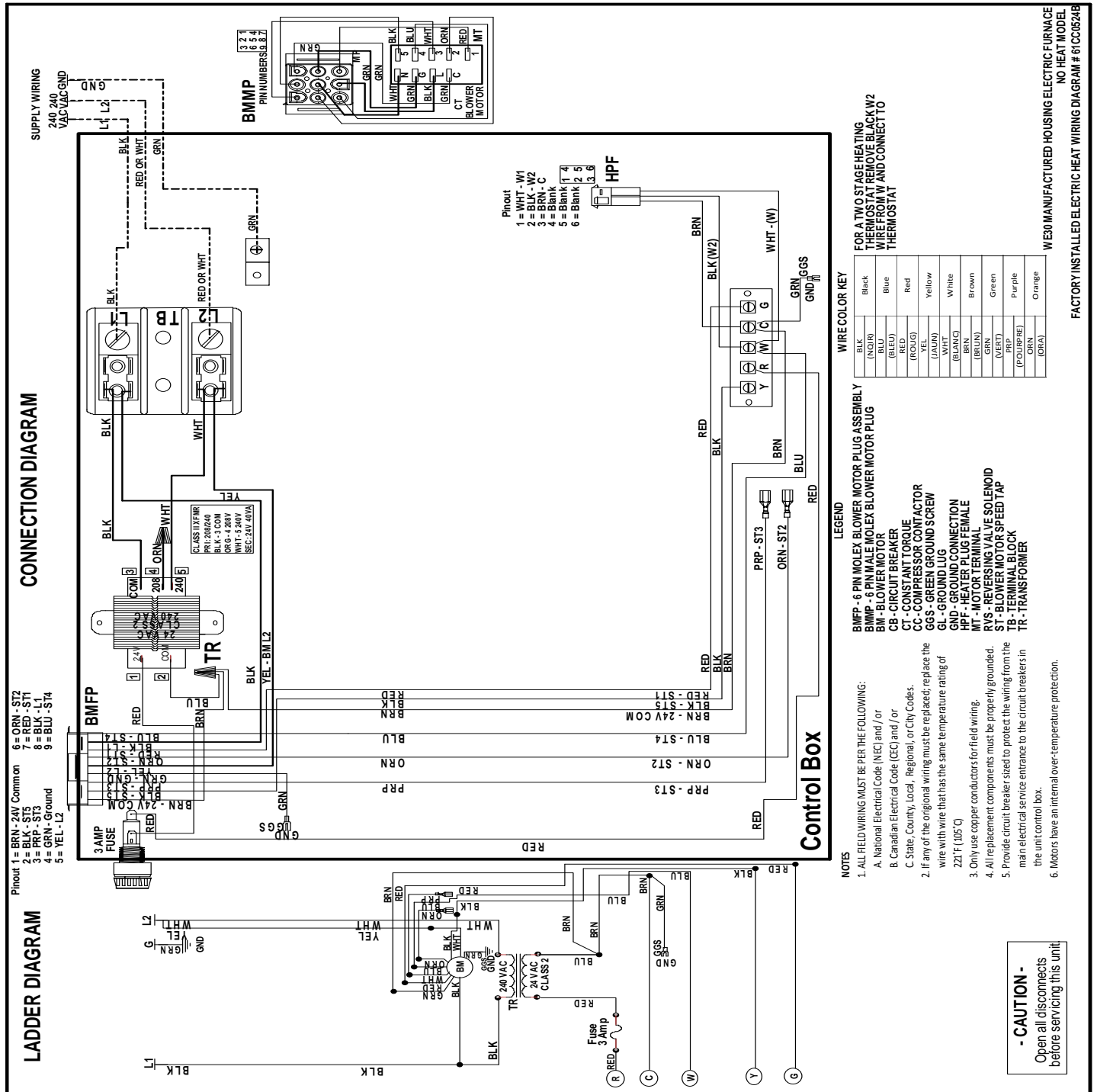


Figure 25: No Electric Heater (0 kW) Wiring Diagram with a Constant Torque blower motor.

NOTE: IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR ITS EQUIVALENT.

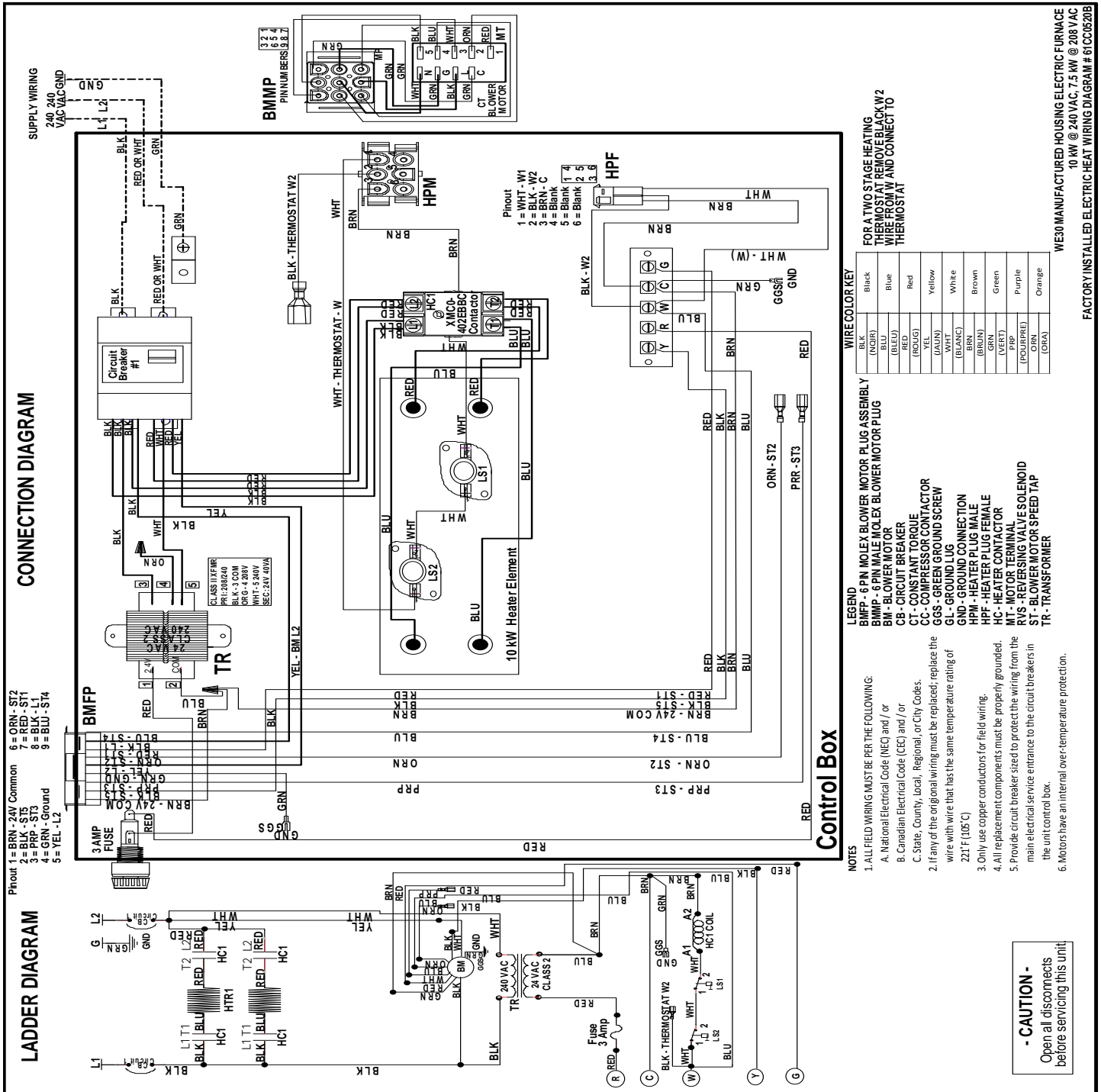
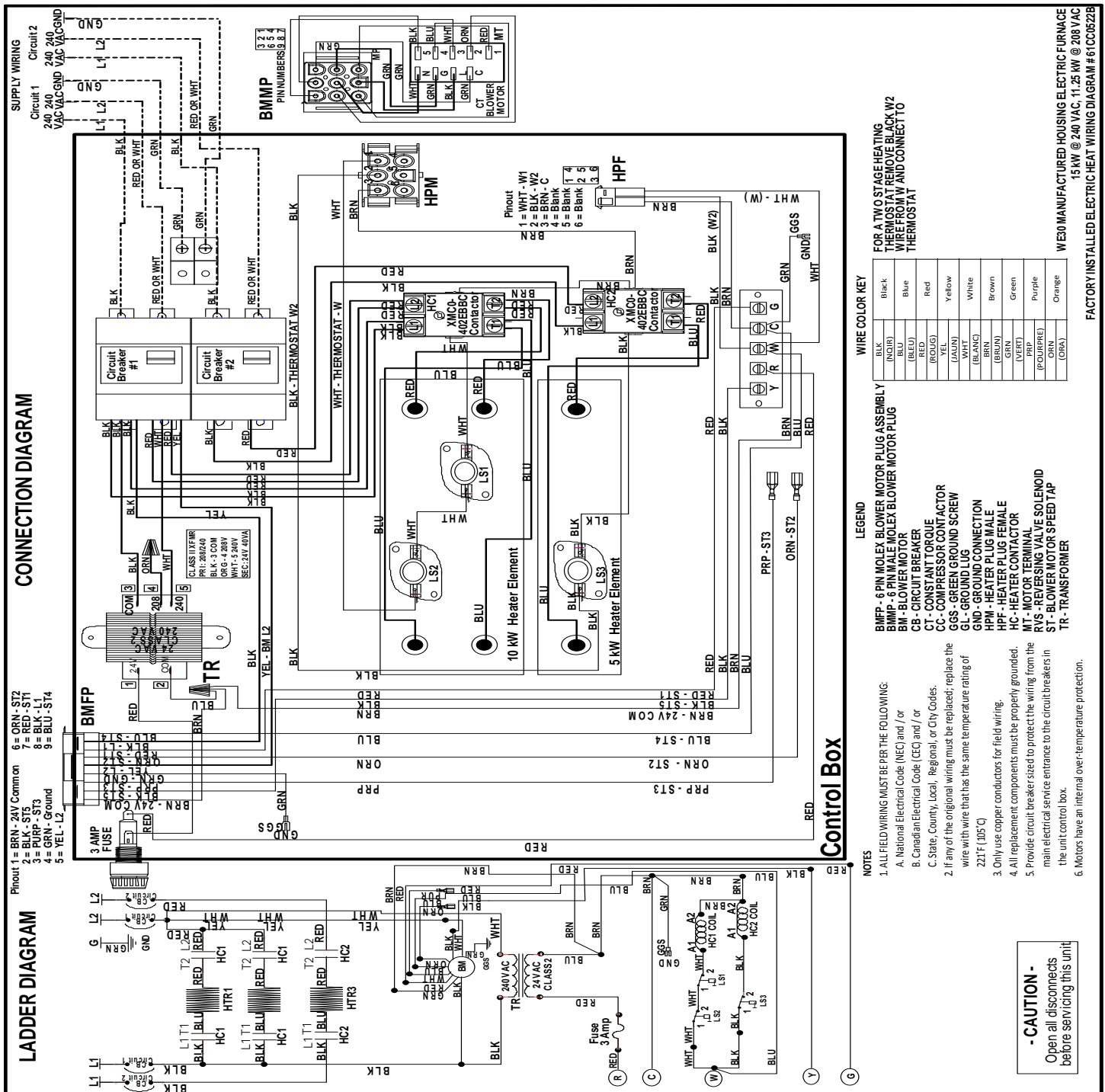


Figure 26: 10kW Factory Installed Electric Heat Wiring Diagram with a Constant Torque blower motor.

**NOTE:** IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR ITS EQUIVALENT.





**Figure 28: 15 kW Factory Installed Two Stage Electric Heat Wiring Diagram with a Constant Torque Blower Motor.**

**NOTE: IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR ITS EQUIVALENT.**

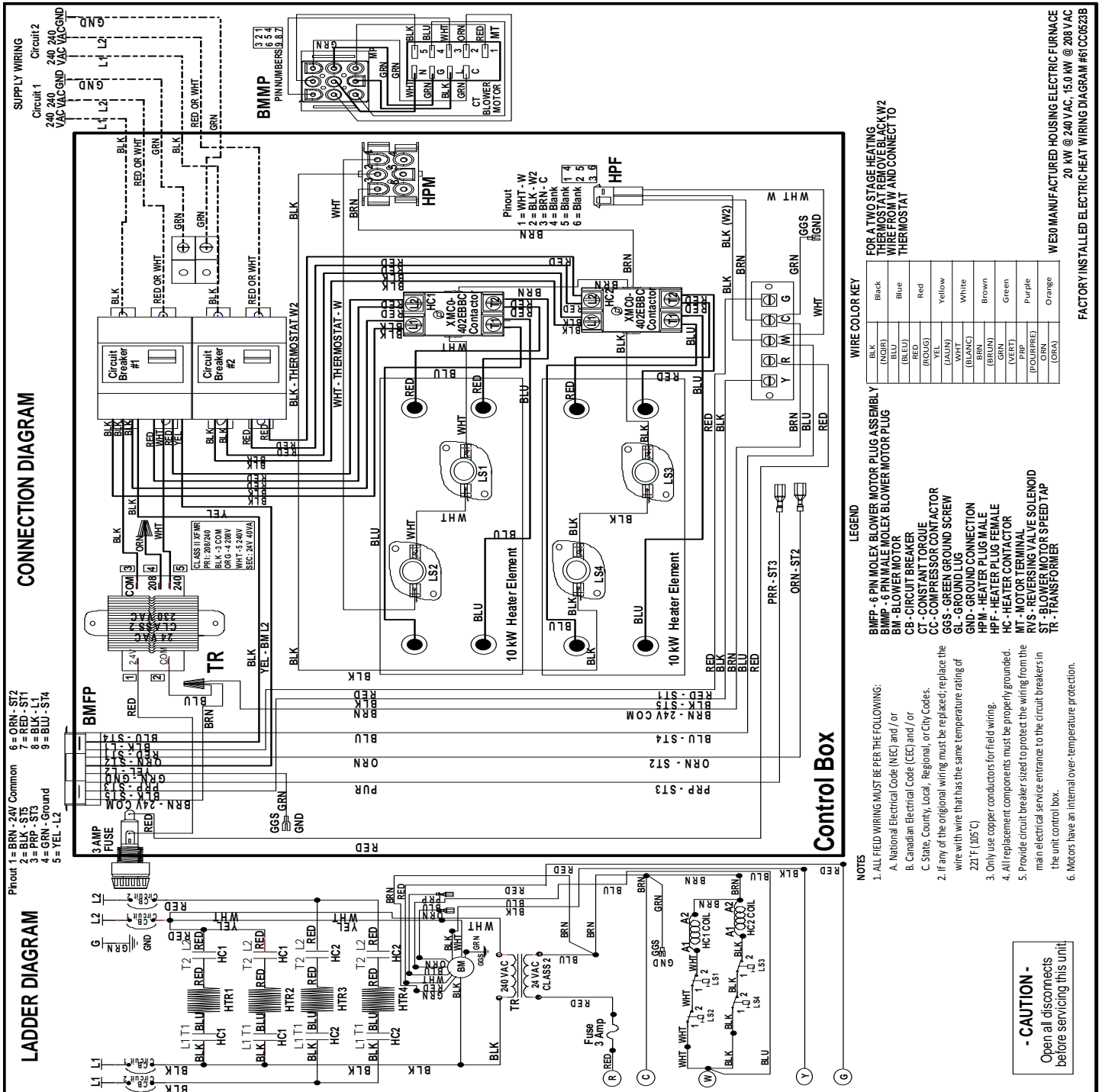


Figure 29: 20 kW Factory Installed Two Stage Electric Heat Wiring Diagram with a Constant Torque Blower Motor.

NOTE: IF ANY OF THE ORIGINAL WIRE SUPPLIED WITH THIS UNIT MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 105°C THERMOPLASTIC OR ITS EQUIVALENT.

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